preparation have decreased risks. The best results have been reported using central venous placement of a silastic catheter (Hickman or Broviac) with a subcutaneous tunnel and a Dacron cuff to prevent ascending infection. The catheter may be placed using local anesthesia via cutdown or simply percutaneous subclavian placement through a breakaway introducer. Preformulated home total parenteral nutrition solutions are available, though many long-term patients may be taught to safely prepare solutions at home with a greatly decreased cost and a heightened feeling of independence.

Benefits are significant. In adults normal body composition and weight develop and in children with Crohn's disease and in neonates, normal growth patterns develop. Most patients are able to obtain adequate nutrition by continuous infusion while sleeping and may resume normal activities during the day; in one report, 70 percent of patients returned to usual employment. Costs of approximately $20,000 a year are significantly less than in-hospital therapy and complications have been much less frequent than that generally reported for in-hospital parenteral nutrition.

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Carotid Endarterectomy

ENDARTERECTOMY of the common carotid bifurcation has become established as a popular operation, with 40,000 done annually. It has a low risk, averaging 2 percent to 3 percent combined morbidity and mortality in most experienced centers.

Its role in the treatment of transient ischemic attacks is well accepted. The role in the treatment of asymptomatic lesions is less clear. Tight stenoses, bilateral stenoses and large or compound ulcers (which are better described as compound deformities rather than ulcers) are being accepted as anatomic indications for operation. The large compound ulcer is associated with a stroke rate of 7½ percent per year; even intermediate (type B) ulcers have a rate of 4½ percent per year. Combined, their average is that of the risk rate of stroke in the presence of transient ischemic attacks, though the risk of an ulcerative lesion increases with time instead of being maximal in early follow-up years.

Noninvasive evaluation of the carotid artery has become increasingly sophisticated and shows promise of increasing accuracy in identifying ulcerated, nonstenotic lesions. The usefulness of noninvasive evaluation of a symptomatic carotid lesion is limited, however, and negative findings from noninvasive studies should never preclude arteriography in a symptomatic patient. The real clinical role lies in the evaluation of asymptomatic lesions and in following patients after operation.

Digitalized subtraction angiography has not yet fully supplanted noninvasive or physiologic studies or classical arteriography.

In the conduct of the operation itself, the use of the shunt remains debatable. Its use is generally accepted in the presence of stump pressures below 25 torr, when serious stenosis exists contralaterally, and in poststroke patients. Some surgeons, however, never use the shunt. Few surgeons use patches except in very small arteries and, as a rule, use only autologous tissue.

Open operative dilatation of difficult-to-reach fibromuscular lesions is now standard, but percutaneous transluminal angiography is not acceptable because of its inherent risk of distal embolic formation.

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Vascular Access for Treatment of Acute Renal Failure

ALTHOUGH THE Quinton-Scribner arteriovenous shunt remains the most widely used form of vascular access for acute hemodialysis, there exists a significant number of patients for whom this procedure is not well suited. This group is often better served by some form of venovenous access. Such access usually requires placing two catheters into the iliofemoral venous system using the Seldinger technique. It is even possible to use single-needle dialysis equipment that alternately removes and returns blood through one cannula.

The venovenous method has become the preferred method when there are contraindications to the use of an arteriovenous shunt. Hemodynamically unstable patients present several problems. Hemodialysis tends to cause episodes of hypotension with poor blood flow from the arterial cannula. Also in such patients thrombosis frequently develops in their arteriovenous shunts between dialyses. With venovenous access flow can be maintained during hypotensive periods and catheters are usually removed between treatments. Patients in whom renal recovery is unlikely to occur should have venovenous access, because the use of an external arteriovenous shunt limits the sites available for the more durable subcutaneous access necessary for ongoing hemodialyis. Some patients lack the vasculature necessary for Quinton-Scribner shunts because of arteriosclerosis, drug abuse, major burns or use for intravenous or intraarterial cannulas. Finally, because of the simplicity and greater ease of placement in the setting of an intensive care unit, patients who are likely to require only one or two dialysis treatments (for example, drug overdose patients) are best served by venovenous dialysis.

There has been some concern regarding thromboembolic complications with repeated femoral vein catheterization, particularly when catheters are left in place.

Additional utility was introduced by Flynn and McGowan when the single-needle technique was applied to the subclavian vein approach, allowing the cannula to be left in place for several weeks. Yet there has been concern with the tendency for single-needle dialysis to recirculate the same blood and such equipment is not always available or functional. These limitations have led to the development of a double-lumen coaxial catheter suitable for subclavian cannulation, allowing hemodialysis through a single #8 French catheter (Vas-Cath, Shiley). This steadily increasing variety of vascular access for patients requiring exigent dialytic therapy provides valuable flexibility.

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Gastric Mucosal Erosion

GASTRIC MUCOSAL EROSION in seriously ill patients is defined as multiple, superficial mucosal defects that occur with serious illness from sepsis, trauma, respiratory failure, uremia or shock. The underlying pathophysiology is obscure and varied and includes such different entities as Curling's ulcer in burn patients, Cushing's ulcers, ulcer occurring from administration of various drugs such as aspirin and alcohol, reflux of bile and the "ICU syndrome" or that which occurs in seriously ill patients in surgical intensive care units. The incidence of ulceration or bleeding from such ulcers (or both) is variable and has been estimated to occur in anywhere from 3 percent to 6 percent of patients who are seriously ill to upwards of 54 percent of patients with intracranial disease, the diagnosis being made by endoscopy.

Over the years the incidence of upper gastrointestinal bleeding from acute gastritis and acute stress ulceration appears to be decreasing. Many of the factors attributed to this decreased incidence are greater attention to appropriate nasogastric drainage, intensive replacement of fluids in burn trauma and seriously ill patients and improved respiratory management. Particularly important has been the attention to better nutritional support, the advent of intravenous administration of hyperalimentation and the widespread occurrence of routine intragastric alkalinization. Despite the presence of gastritis in acute mucosal lesions, few of these patients (less than 20 percent) ever bleed to the point where they require operative intervention.

Maintaining the gastric luminal pH at 7.0 with antacids has resulted in a decreased incidence of ulceration in seriously ill patients. In a prospective study by Priebe and Skillman in 1980, findings in a group of patients treated with antacids were compared with those in a group treated with cimetidine. In 37 patients receiving antacids, no bleeding was noted as opposed to an 8 percent bleeding rate in those given cimetidine. Other studies have indicated no differences in prophylaxis between cimetidine and antacids and that using one or the other was significantly better than no treatment. Zinner and associates noted that the benefit of antacids over cimetidine was greatest among those patients with the greatest number of risk factors. It was apparent that antacids more satisfactorily achieved adequate pH control ($pH > 3.5$).

Once bleeding occurs, a wide range of nonoperative approaches has been used, such as continued antacid installation and administration of cimetidine, along with iced gastric lavage and localized gastric cooling. Others have advocated the use of endoscopic electrocoagulation or endoscopic coagulation with a laser or both. Prostaglandin has been shown in studies using animals to have some promising usefulness but is not yet available for human use. Evidence exists that vasopressin given intravenously has a similar effect to intraarterially administered vasopressin. The effectiveness of vasopressin on the rate of bleeding from acute gastritis is variable. Recurrent bleeding is the rule and using vasopressin rarely alters the decision to operate.

When surgical intervention becomes necessary, a variety of procedures have been advocated, with a more extensive operation such as gastric resection or total gastrectomy having the greatest mortality and morbidity. Vagotomy and pyloroplasty with suture ligation of the bleeding site has the best overall clinical effect with the lowest mortality. Satisfactory cessation of bleeding, however, is usually achieved only when actual suture of a bleeding site is possible. Recurrent bleeding is generally best managed by a total or near-total gastrectomy. The percentage of patients requiring operation has continued to drop as advances are made in adequate prophylaxis.

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Infection in Burn Patients

BARRIERS AGAINST INFECTION of a burn wound include asepsis, antisepsis, prompt burn excision and wound closure, effective nutrition, either prophylactic or therapeutic (or both) use of systemic antimicrobial agents and immune factors.

Whereas sterile laminar airflow plus barrier isolation has been reported in one or two centers to prevent cross-infection, no definitively controlled study has yet confirmed this or shown the cost-effectiveness of this aseptic technique. In experimental studies using animals, *Aloe vera* applied topically appears promising for its antimicrobial properties and in preventing progressive burn ischemia, but it remains inadequately